

About the Book

Since the revolution in molecular biology following the elucidation of the structures of DNA in mid 1950s, research has been directed mainly in this field and its related areas. Around the same time as Watson and Crick, and another renowned scientist, Peter Mitchell had made a break-through in the field of bioenergetics. He had discovered that the coupling between the electron transport chain and ATP synthesis is mediated by the electrochemical potential of protons. In this book fundamental laws have been derived based on the concept of proton motive force. ATP is a rechargeable source of PMF, which produces protons at high PMF in enzymes when its terminal phosphoryl group phosphorylates a metabolite of water. Proton transfers between bases are used by enzymes to enhance the rate of enzyme catalyzed endergonic reactions. Finally, a few serious problems regarding the structure and synthesis of DNA have been addressed. The two laws provide insight into the synthesis of the information-rich polynucleotide by invoking a flow of nucleotides towards DNA polymerase and the reactions during base pairing. A model for the synthesis of RNA has been proposed which provides a clue to the origin of the genetic code.

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